

## **Nuclear Blast**

- A nuclear blast, produced by explosion of a nuclear bomb (sometimes called a nuclear detonation), involves the joining or splitting of atoms (called fusion and fission) to produce an intense pulse or wave of heat, light, air pressure, and radiation. The bombs dropped on Hiroshima and Nagasaki, Japan, at the end of World War II produced nuclear blasts.
- When a nuclear device is exploded, a large fireball is created. Everything inside of this fireball vaporizes, including soil and water, and is carried upwards. This creates the mushroom cloud that we associate with a nuclear blast, detonation, or explosion. Radioactive material from the nuclear device mixes with the vaporized material in the mushroom cloud. As this vaporized radioactive material cools, it becomes condensed and forms particles such as dust. The condensed radioactive material then falls back to the earth; this is what is known as fallout. Because fallout is in the form of particles, it can be carried long distances on wind currents and end up miles from the site of the explosion. Fallout is radioactive and can contaminate anything on which it lands, including food and water supplies.

### **Effects of a Nuclear Blast**

- The effects on a person from a nuclear blast will depend on the size of the bomb and the distance the person is from the explosion. However, a nuclear blast would likely cause great destruction, death, and injury and have a wide area of impact.
- In a nuclear blast, injury or death may occur as a result of the blast itself or as a result of debris thrown from the blast. People may experience moderate to severe skin burns, depending on their distance from the blast site. Those who look directly at the blast could experience eye damage ranging from temporary blindness to severe burns on the retina. Individuals near the blast site would be exposed to high levels of radiation and could develop symptoms of radiation sickness (called acute radiation syndrome, or ARS). While severe burns would appear in minutes, other health effects might take days or weeks to appear. These effects range from mild skin reddening to severe effects such as cancer and death, depending on the amount of radiation absorbed by the body (the dose), the type of radiation, the route of exposure, and the length of time of the exposure.

- People may experience two types of exposure from radioactive materials from a nuclear blast: external exposure and internal exposure. External exposure would occur when people were exposed to radiation from the blast or its fallout. Internal exposure would occur when people ate food or breathed air that was contaminated with radioactive fallout. Both internal and external exposure from fallout could occur miles away from the blast site. Exposure to very large doses of external radiation may cause death within a few days or months. External exposure to lower doses of radiation and internal exposure from breathing or eating food contaminated with radioactive fallout may lead to an increased risk of developing cancer and other health problems.

### **Protection During a Nuclear Blast**

- In the event of a nuclear blast, a national emergency response plan would be activated by federal, state, and local agencies. Following are some steps recommended by the World Health Organization if a nuclear blast occurs.

#### **If you are near the blast when it occurs:**

- Turn away and close and cover your eyes to prevent damage to your sight.
- Drop to the ground face down and place your hands under your body.
- Remain flat until the heat and two shock waves have passed.

#### **If you are outside when the blast occurs:**

- Find something to cover your mouth and nose, such as a scarf, handkerchief, or other cloth.
- Remove any dust from your clothes by brushing, shaking, and wiping in a ventilated area—however, cover your mouth and nose while you do this.
- Move to a shelter, basement, or other underground area, preferably located away from the direction that the wind is blowing.
- Remove clothing since it may be contaminated; if possible, take a shower, wash your hair, and change clothes before you enter the shelter.

#### **If you are already in a shelter or basement:**

- Cover your mouth and nose with a face mask or other material (such as a scarf or handkerchief) until the fallout cloud has passed.
- Shut off ventilation systems and seal doors or windows until the fallout cloud has passed. However, after the fallout cloud has passed, unseal the doors and windows to allow some air circulation.

- Stay inside until authorities say it is safe to come out.
- Listen to the local radio or television for information and advice. Authorities may direct you to stay in your shelter or evacuate to a safer place away from the area.
- If you must go out, cover your mouth and nose with a damp towel.
- Use stored food and drinking water. Do not eat local fresh food or drink water from open water supplies.
- Clean and cover any open wounds on your body.

**If you are advised to evacuate:**

- Listen to the radio or television for information about evacuation routes, temporary shelters, and procedures to follow.
- Before you leave, close and lock windows and doors and turn off air conditioning, vents, fans, and furnace. Close fireplace dampers.
- Take disaster supplies with you (such as a flashlight and extra batteries, battery-operated radio, first aid kit and manual, emergency food and water, nonelectric can opener, essential medicines, cash and credit cards, and sturdy shoes).
- Remember, your neighbors may require special assistance, especially infants, elderly people, and people with disabilities.

**Suitcase Bombs**

- The “suitcase” bombs that have been described in news stories in recent years are small nuclear bombs. A suitcase bomb would produce a nuclear blast that is very destructive but not as great as a nuclear weapon developed for strategic military purposes.

**Dirty Bombs**

- A nuclear blast is different than a dirty bomb. A dirty bomb, or radiological dispersion device, is a bomb that uses conventional explosives such as dynamite to spread radioactive materials in the form of powder or pellets. It does not involve the splitting of atoms to produce the tremendous force and destruction of a nuclear blast, but rather it spreads smaller amounts radioactive material into the surrounding area. The main purpose of a dirty bomb is to frighten people and contaminate buildings or land with radioactive material.

### **Nuclear Power Plant Accidents**

- While a serious event such as a plane crashing into a nuclear power plant could result in a release of radioactive material into the air, a nuclear power plant would not explode like a nuclear weapon. There may be a radiation danger in surrounding areas, depending on the type of incident, the amount of radiation released, and the current weather patterns. However, radiation would be monitored to determine the potential danger, and people in the local area would be evacuated or advised on how to protect themselves.

### **Potassium Iodide (KI)**

- Local emergency management officials will tell people when to take KI. If a nuclear incident occurs, officials will have to find out which radioactive substances are present before recommending that people take KI. If radioactive iodine is not present, then taking KI will not protect people. If radioactive iodine is present, then taking KI will help protect a person's thyroid gland from the radioactive iodine. Taking KI will not protect people from other radioactive substances that may be present.

*Condensed from a paper developed by the Center for Disease Control and Prevention entitled "Nuclear Blasts"*